

## CLAIMS

What is claimed is:

1           1.     A method of modifying an existing telephone network, the method  
2 comprising:  
3           coupling interface devices to the telephone network, the interface devices coupled  
4 to circuitry coupled to radio transceivers that service mobile subscribers that may be  
5 located in ones of the various geographic regions, the mobile subscribers each being  
6 assigned to a respective geographic region;

7           wherein the interface devices are coupled to circuitry that, when a subscriber is  
8 located in a region other than a geographic region to which the subscriber is assigned,  
9 routes a call with the mobile subscriber through a path including a radio transceiver that  
10 serves the region in which the mobile subscriber is currently located and an interface  
11 device that serves the region to which the subscriber is assigned.

12           2.     The method of claim 1, wherein the existing telephone network comprises a  
13 public switched telephone network (PSTN).

14           3.     The method of claim 1, wherein the path between the radio transceiver and  
15 the interface device in the region to which the subscriber is assigned does not include the  
16 existing telephone network.

1           4.     The method of claim 1, wherein the path between the radio transceiver and  
2     the interface device that serves the region to which the subscriber is assigned includes the  
3     existing telephone network.

1           5.     The method of claim 1, wherein the path between the radio transceiver and  
2     the interface device that serves the region to which the subscriber is assigned includes an  
3     E1 link.

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5 for communicating with subscribers located in the plurality of geographic regions, each  
6 subscriber having a home region, various subscribers being located outside of their home  
7 regions; and

8 circuitry that routes all communication between a subscriber and the first network  
9 through an interface between the first network and the second network in the subscriber's  
10 home region.

1 10. The communications system of claim 9, wherein the first network  
2 comprises a PSTN.

3 11. The communications system of claim 9, wherein the circuitry that routes all  
4 communication includes a computer coupled to bearer and control channels coupled to the  
5 interfaces for routing, between the respective interfaces, calls with subscribers located  
6 outside their respective home regions.

7 12. A communications system comprising:  
8 a set of interfaces adapted to be coupled to a PSTN, the interfaces configured to  
9 serve various geographic regions;  
10 circuitry coupled to the set of interfaces that, for communication between the  
11 PSTN and a subscriber located in a region other than a region served by an interface to  
12 which the subscriber is assigned, causes the communication to take place via the interface  
13 to which the subscriber is assigned.

1 13. The communications system of claim 12, wherein the circuitry coupled to  
2 the set of interfaces is coupled to the interfaces via an E1 interface.

1           14.    The communications system of claim 12, wherein communication between  
2   the circuitry coupled to the set of interfaces and the subscriber takes place entirely over a  
3   land line system.

1           15.    The communications system of claim 12, including circuitry coupled to the  
2   set of interfaces that converts a signal from the subscriber to packets before passing the  
3   signal to the PSTN.

1           16.    The communications system of claim 12, wherein communication between  
2   the circuitry coupled to the set of interfaces and the subscriber takes place at least partially  
3   by radio transmission.

1           17.    A communications system comprising:  
2           a set of interface devices adapted to be coupled to a PSTN, the interface devices  
3           configured to serve various geographic regions;  
4           radio transceivers coupled to interface devices in the set of interface devices, the  
5           radio transceivers for communication with mobile subscribers, the mobile subscribers each  
6           having a home region; and  
7           circuitry coupled to the set of interface devices that, for a call involving the PSTN  
8           and a mobile subscriber located outside the mobile subscriber's home region, routes the  
9           call through a path including an interface device that serves the mobile subscriber's home  
10          region.

1 18. The communications system of claim 17, wherein, for a call to a mobile  
2 subscriber, the circuitry coupled to the set of interfaces determines the region in which the  
3 mobile subscriber is located and routes the call through a path including the interface that  
4 serves the mobile subscriber's home region and the interface that serves the region in  
5 which the mobile subscriber is located.

1 19. The communications system of claim 17, wherein the subscriber has a set  
2 of directory numbers and each call is associated with at least one directory number, and  
3 for a call to the mobile subscriber, the circuitry coupled to the set of interfaces, upon  
4 detecting that the mobile subscriber is located outside the mobile subscriber's home  
5 region, routes the call depending on instructions in a subscriber service profile, the  
6 instructions being associated with the directory number that is associated with the call.

1 20. The communications systems of claim 19, wherein, depending on the  
2 instructions in the subscriber service profile, the call is routed to one of (a) the subscriber,  
3 (b) another subscriber, and (c) a voice mail box.

1 21. The communications system of claim 17, wherein, for a call from a mobile  
2 subscriber, the circuitry coupled to the set of interfaces routes the call through a path  
3 including the interface in the region in which the mobile subscriber is located and the  
4 interface in the mobile subscriber's home region.

1 22. The communications system of claim 17, wherein the mobile subscriber has  
2 a transceiver with circuitry that transmits information regarding the mobile subscriber's  
3 home region to the circuitry coupled to the set of interfaces.

1           23.    The communications system of claim 17, wherein the circuitry coupled to  
2   the set of interfaces comprises computer systems located in different areas, a computer  
3   system located in each respective area routing calls between the interfaces in the  
4   respective area.

1           24.    The communications system of claim 17, wherein the circuitry coupled to  
2   the set of interfaces comprises multiple computer systems, each computer system coupled  
3   to sets of bearer and control channels and each computer system coupled to the other  
4   computer systems by a common control bus.

1           25.    The communications system of claim 24, wherein the common control bus  
2   comprises a physically localized local area network.

1           26.    The communications system of claim 24, wherein the common control bus  
2   comprises a physically distributed internet.

1           27.    The communications system of claim 23, wherein the computer systems  
2   located in each respective area are coupled to multiple others of the computer systems  
3   located in the respective other areas.

1           28.    The communications system of claim 17, wherein the circuitry that routes  
2   the call routes the call through a path including the PSTN between the mobile subscriber  
3   and the interface device that serves the subscriber's home region.

1           29.    The communications system of claim 17, wherein the interface devices  
2 include roaming gateways coupled to the PSTN and coupled via a control bus to the  
3 circuitry that routes the call.

1           30.    The communications system of claim 29, wherein the control bus  
2 comprises a physically localized local area network.

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2           31.    The communications system of claim 29, wherein the control bus  
comprises a physically distributed internet.

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2           32.    The communications system of claim 29, wherein the circuitry that routes  
3 the call routes the call through a path including the PSTN assigns routing numbers to each  
4 interface device from among a pool of reserved PSTN numbers and releases the routing  
5 numbers upon call completion.

10           33.    A communications system comprising:  
2           a set of interface devices adapted to be coupled to a PSTN, the interface devices  
3 configured to serve various geographic regions;  
4           radio transceivers coupled to interface devices in the set of interface devices, the  
5 radio transceivers for communication with mobile subscribers, the mobile subscribers each  
6 having a home region; and  
7           circuitry coupled to the set of interfaces that, for a call involving the PSTN and a  
8 mobile subscriber located outside the mobile subscriber's home region, routes the call  
9 through a path including an interface device that serves in the mobile subscriber's home  
10 region;

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12 wherein the path between the subscriber and the interface device in the mobile subscriber's home region includes a portion of the PSTN.

1 34. The communications system of claim 33, wherein the portion of the path  
2 through the PSTN between the subscriber and the interface device and the mobile  
3 subscriber's home region is obtained based on a routing number assigned to the interface  
4 that serves the region in which the subscriber is currently located.

1 35. The communications system of claim 33, wherein a control bus is included  
2 in the circuitry that routes the call through a path including the interface device that serves  
3 the mobile subscriber's home region, and wherein the control bus is coupled to (a) an  
4 interface device to the PSTN that serves the subscriber's home region and (b) an interface  
5 device to the PSTN that serves a region in which the subscriber is located.

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1 36. A communications system comprising:  
2 a set of interface devices adapted to be coupled to a PSTN, the interface devices  
3 configured to service various geographic regions;  
4 coupled to each interface device, a set of devices for communicating with radio  
5 transceivers, each device for communicating with radio transceivers coupled to one or  
6 more radio transceivers;  
7 circuitry coupled to the set of interface devices that, with respect to calls from the  
8 PSTN to mobile subscribers, has the same type of interface as the set of devices for  
9 communicating with the radio transceivers, and wherein, if a call from the PSTN through  
10 an interface device is directed to a subscriber in an area not serviced by the set of devices  
11 for communicating with the radio transceivers coupled to the interface, routes the call to



an interface device coupled to a set of devices for communicating that service an area in which the subscriber is located.

37. The communications system of claim 36, the circuitry coupled to the set of interface devices routing the call without interrogating a centralized database.

38. The communications system of claim 36, the circuitry coupled to the set of interface devices routing the call without interrogating a home location register (HLR) and without interrogating a visited location register (VLR).

39. The communications system of claim 36, wherein the set of devices for communicating with the radio transceivers comprise radio port controllers (RPCs).

40. A communications system comprising:  
a set of interface devices adapted to be coupled to a PSTN, the interface devices configured to service various geographic regions;

coupled to each interface device, a set of devices for communicating with radio transceivers, each device for communicating with radio transceivers coupled to one or more radio transceivers; and

circuitry coupled to the set of interface devices that, with respect to calls from subscribers to the PSTN, has the same type of interface as a port on the PSTN, and wherein, if a call from a subscriber located outside the subscriber's home area is direct to the PSTN, the circuitry coupled to the set of interface devices routes the call to an interface device that serves the subscriber's home area.



1 45. The method of claim 44, wherein the path between the radio transceiver  
2 and the interface device in the region to which the subscriber is assigned includes an E1  
3 link.

1 46. The method of claim 44, wherein, for calls with the subscriber located in a  
2 region other than the geographic region to which the subscriber is assigned, billing  
3 information is passed to the existing network regarding location of the subscriber only  
4 through the interface in the region to which the subscriber is assigned.

5 47. A communications system comprising:  
6 a set of interface devices adapted to be coupled to a PSTN, the interface devices  
7 configured to be located in various geographic regions;  
8 radio transceivers coupled to interface devices in the set of interface devices, the  
9 radio transceivers for communication with mobile subscribers, the mobile subscribers each  
10 having a home region; and  
11 circuitry coupled to the set of interfaces that, for a call involving the PSTN and a  
mobile subscriber located outside the mobile subscriber's home region, routes the call  
through a path including an interface device in the mobile subscriber's home region;  
wherein the path between the subscriber and the interface device in the mobile  
subscriber's home region includes a portion of the PSTN.